XIII. THE HYOID BONE IN MASTODON AMERICANUS.

By W. J. Holland, LL.D.

The Carnegie Museum, in the fall of the year 1898 obtained through the kindness of Mr. Andrew Carnegie the gift of the skeleton of a mastodon, which had been found in a peat-bog about five miles west of the village of Waterloo, in northern Indiana. The bones were carefully removed from their resting place and the skeleton was assembled by Mr. Henry Ward and his associates at that time connected with Ward's Natural Science Establishment at Rochester, New York. The specimen is, with one exception, the most perfect skeleton of a single individual of the species hitherto discovered in North America, and it is believed also to be the largest.

It is not the purpose of the writer to enter into a detailed description of the specimen, but to merely describe and figure certain bones, which, so far as he is able to ascertain, have not yet been found with similar remains, and which, therefore, possess interest. These bones are the basi-hyal, and the thyro-hyals. With these were found the styloid processes. All of these bones are remarkably well preserved.

The Styloid Processes (Fig. 1). — The left styloid has had a por-

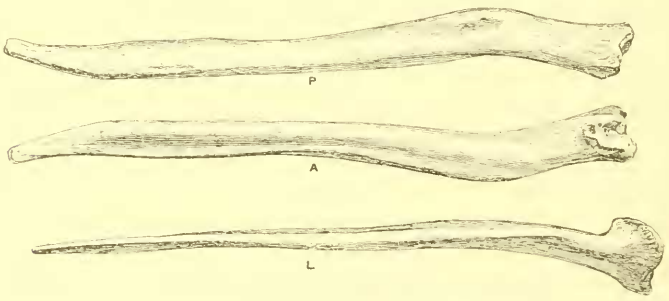

Fig. 1. Right styloid process of *Mastodon Americanus* Kerr. *P*, posterior view; *A*, anterior view; *L*, external lateral view. (Figures $\frac{1}{3}$ nat. size.)

tion of its distal extremity broken off. It is without its tip 23.50 cm. or 9.18 inches in length. The right styloid, the tip of which has not been injured, measures 24.70 cm. or nearly 9.75 inches in length. The specimen, therefore, approximately agrees in length with those

described by Warren in 1852, in his work entitled "The Mastodon Giganteus of North America," p. 13. The cranial extremities of the bones show well defined articular surfaces, the depressions and elevations in which are homologous in the bones of the left and the right hand sides. (See Fig. 2.) A layer of fibro-cartilage probably was interposed between the styloids and the *os temporis*.

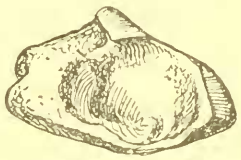

Fig. 2. Articular surface of right styloid process of *Mastodon Americanus* Kerr. (Nat. size.)

The description of the styloid bones given by Warren, which applies well to the specimen before the writer, is as follows:

"The styloid processes are both perfect, measuring more than nine inches in length. They are attached at the base of the petrous portion of the temporal bones. This process is rarely seen in place; but in the head of a young elephant we find it connected with the temporal bone by a ligament. The cranial extremity of this bone, presenting the marks of the attachment of a fibro-cartilage, which intervened between it and the os temporis, is more than an inch across its longest diameter. From this end the bone tapers with some degree of regularity to its cervical extremity, which is pointed. The bone is curved at its upper part; and one side of the curved portion is fluted like the human clavicle, where the subclavian muscle lies under it. The texture of the bone is quite dense; for which reason it has been preserved in a state of perfect integrity, notwithstanding the slenderness in its form."

Fig. 3. Inferior view of basi-hyal bone of *Mastodon Americanus* Kerr. *A*, Anterior margin; *B*, posterior margin; *TH*, *TH*, inferior extremities of thyrohyals. (⅓ nat. size.)

The Basi-hyal Bone (Figs. 3, 4, 5).—The extreme length of the bone, measured at the symphyses with the thyro-hyals, is 15.5 cm. The thickness at the middle is 2.5 cm. It is, roughly speaking, triangular in section at the middle; anteriorly longitudinally convex, posteriorly longitudinally concave. A strongly defined, somewhat recurved ridge is developed on the anterior surface, dividing it into a superior and an inferior portion. The free surface of the upper margin between the two thyro-hyals measures 7.25 cm. in length. At either end of the basi-hyal, at the points where it coössifies with the

thyro-hyals, there is evidence of the attachment of cerato-hyals, or of ligaments connecting with or having the function of these bones. They are, however, missing in the specimen.

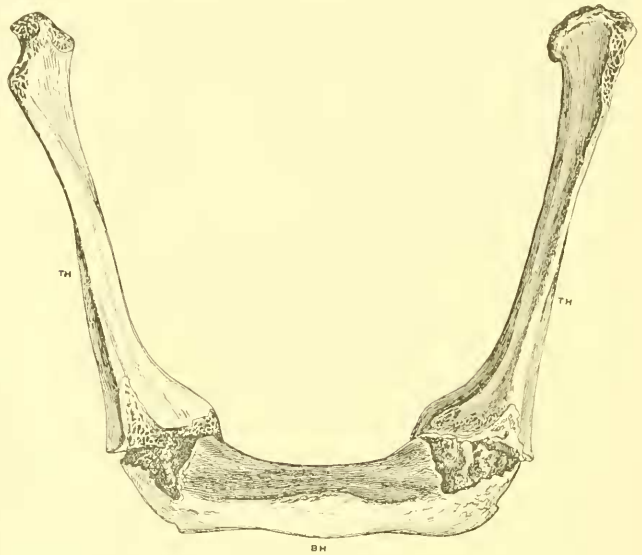

FIG. 4. Anterior view of hyoid bone of *Mastodon Americanus* Kerr. *BH*, basi-hyal bone; *TH*, thyro-hyal bones. ($\frac{1}{3}$ nat. size.)

The Thyro-hyal Bones (Figs. 3, 4, 5). — The extreme length of these bones from their symphyses with the basi-hyal to their upper extremities is 18.75 cm. Their width at the point of union with the basi-hyal is 5.10 cm., and at the middle of the shafts is only 2.85 cm. They again widen at their upper extremities to 4.30 cm. The thickness of the shaft at the middle is only 1 cm. The bones are flattened on their outer surfaces, laterally convex inwardly, and the anterior margin near the upper extremity is twisted and flares outwardly. The anterior margin is approximately straight until near the upper end, when it curves rapidly backward. The posterior margin is gently concave. At the point of union with the basi-hyal the bone is greatly thickened.

Evidences of the usual muscular attachments are found everywhere upon the antero-superior surfaces of the bones.

The mastodon evidently was provided with powerful vocal organs,

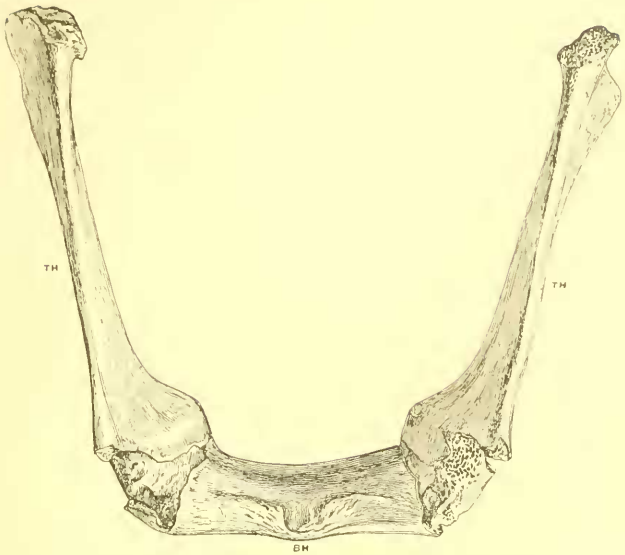

Fig. 5. Posterior view of hyoid bone of *Mastodon Americanus* Kerr. *BH*, basi-hyal bone; *TH*, thyro-hyals. (⅓ nat. size.)

and at a time geologically not far remote the woodlands of North America again and again resounded to the shrill trumpetings of the mighty beasts.